

Name: _____

Date: _____

A2CC: Simplifying Rational Expressions

A **rational expression** is a ratio of polynomials. A rational expression is said to be **undefined** if its denominator is zero.

1. For what value(s) of x does the expression have no meaning?

(a) $\frac{5}{x}$ (b) $\frac{11}{x-7}$ (c) $\frac{x-2}{x^2-9}$ (d) $\frac{x^2-x-12}{x^2-7x+10}$ (e) $\frac{3}{b^2-2b+1}$

2. Find the value(s) of the variable for which each rational expression is not defined.

(a) $\frac{x^2-49}{2x^2-3x}$ (b) $\frac{4}{c^2-16}$ (c) $\frac{x-2}{x^2+4}$ (d) $\frac{6}{3x^3-8x^2+4x}$

Simplify each expression.

3. $\frac{15x^2}{35x^4}$

8. $\frac{15mx}{5m^2x}$

4. $\frac{x^2+2x}{x}$

9. $\frac{n^2+8n+16}{16-n^2}$

5. $\frac{2x^2-8}{(2x-1)(x-2)}$

10. $\frac{20-4x}{x^2-2x-15}$

6. $\frac{4b^2-4ab}{3a^2-3ab}$

11. $\frac{5y^2+10xy}{5y}$

7. $\frac{x^2+6x+5}{x^2-x-2}$

12. $\frac{a^2-16b^2}{a^3+64b^3}$

$$13. \frac{x^2 - 4}{x^4 - 16}$$

$$16. \frac{x^2 + 2x + xy + 2y}{x^2 + 4x + 4}$$

$$14. \frac{x^3 + 8}{x^3 - 2x^2 + 4x}$$

$$17. \frac{a^2 - b^2}{a^2 - 6b - ab + 6a}$$

$$15. \frac{x^2 + 4x + 3}{x^2 + 2x + 1}$$

Steps for Simplifying Rational Expressions:

1. Completely factor the numerator and denominator
2. Cancel common factors

$$\text{*Note } \frac{a-b}{b-a} = -1$$